

WHAT IS CLAIMED IS:

1. A perpendicular magnetic recording medium,
comprising:

a substrate;

5 a soft magnetic underlayer formed on the
substrate;

arrayed soft magnetic dots formed on the soft
magnetic underlayer; and

10 a ferromagnetic recording layer formed on the soft
magnetic dots and having magnetic anisotropy in a
direction perpendicular to a surface of the substrate.

2. The perpendicular magnetic recording medium
according to claim 1, further comprising a nonmagnetic
layer between the soft magnetic dots and the
15 ferromagnetic recording layer.

3. The perpendicular magnetic recording medium
according to claim 2, wherein the nonmagnetic layer
is embedded between the adjacent soft magnetic dots,
a surface of the nonmagnetic layer being substantially
20 flat.

4. The perpendicular magnetic recording medium
according to claim 1, wherein the soft magnetic
underlayer and the soft magnetic dots are in contact
with each other.

25 5. The perpendicular magnetic recording medium
according to claim 1, further comprising a nonmagnetic
layer having a thickness of 10 nm or less between the

soft magnetic underlayer and the soft magnetic dots.

6. The perpendicular magnetic recording medium according to claim 1, wherein a thickness of the soft magnetic dots is 100 nm or less.

5 7. A perpendicular magnetic recording medium, comprising:

 a substrate;

 a soft magnetic underlayer formed on the substrate;

10 a nonmagnetic layer formed on the soft magnetic underlayer;

 a ferromagnetic recording layer formed on the nonmagnetic layer and having magnetic anisotropy in a direction perpendicular to a surface of the substrate;

15 and

 arrayed soft magnetic dots formed on the ferromagnetic recording layer.

 8. The perpendicular magnetic recording medium according to claim 7, further comprising a nonmagnetic layer between the ferromagnetic recording layer and the soft magnetic dots.

 9. The perpendicular magnetic recording medium according to claim 7, wherein a thickness of the soft magnetic dots is 100 nm or less.

25 10. A perpendicular magnetic recording medium, comprising:

 a substrate;

a soft magnetic underlayer formed on the substrate;

a nonmagnetic layer formed on the soft magnetic underlayer;

5 arrayed ferromagnetic recording regions defined by grooves engraved in a ferromagnetic layer formed on the nonmagnetic layer, the ferromagnetic recording regions having magnetic anisotropy in a direction perpendicular to a surface of the substrate; and

10 arrayed soft magnetic dots formed on the respective ferromagnetic recording regions.

11. The perpendicular magnetic recording medium according to claim 10, further comprising a nonmagnetic layer between the ferromagnetic recording regions and
15 the soft magnetic dots.

12. The perpendicular magnetic recording medium according to claim 10, wherein a thickness of the soft magnetic dots is 100 nm or less.

13. The perpendicular magnetic recording medium
20 according to claim 10, wherein a depth of the grooves is smaller than a thickness of the ferromagnetic layer.

14. The perpendicular magnetic recording medium according to claim 10, wherein the grooves reach the nonmagnetic layer.

25 15. A perpendicular magnetic recording medium, comprising:

a substrate;

a soft magnetic underlayer formed on the substrate
and having arrayed projections on a surface thereof
opposite to the substrate; and

5 a ferromagnetic recording layer formed on the soft
magnetic underlayer and having magnetic anisotropy in a
direction perpendicular to a surface of the substrate.

16. The perpendicular magnetic recording medium
according to claim 15, further comprising a nonmagnetic
layer between the projections of the soft magnetic
10 layer and the ferromagnetic recording layer.

17. The perpendicular magnetic recording medium
according to claim 15, wherein a height of the
projections is 100 nm or less.